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Three Gorges Update

936B0092B Beijing RENMIN RIBAO in Chinese
26 May 93 p 1

[Article by reporter Lu Yongjian [7773 3057 1696]:
"Preliminary Design for Three Gorges Project Passes
Evaluation by Experts, Congratulatory Letter From Premier
Li Peng Arrives During Evaluation Meeting"]

[Text] On the afternoon of 24 May 1993, 17 experts in the Preliminary Design Evaluation Core Experts' Group signed the conclusions of the experts' evaluation of the preliminary design for the Three Gorges key water conservancy project. This brought the 17 day-long experts' meeting to evaluate the preliminary design of the Three Gorges project to a satisfactory conclusion. A congratulatory letter from State Council premier Li Peng arrived during the meeting.

Premier Li Peng said in his letter that in April 1992 the 5th Session of the 7th National People's Congress passed the "Decision Concerning Construction of the Three Gorges Project" which decided to approve the inclusion of the Three Gorges project in the 10-Year Program for Development of our National Economy and Society, with the State Council selecting the organizational measures at an appropriate time. The project is now in the stage of preparations for construction, so focusing closely on evaluation of the preliminary design for the Three Gorges project is an important link in smooth construction of the project. All of the experts who wished to participate in the meeting embodied the spirit of responsibility to the state, to science, and to history, spoke their minds freely, offered advice and suggestions, did the preliminary design evaluation work well, and revised and supplemented the preliminary design to make it more perfect.

This Three Gorges project preliminary design experts' evaluation meeting was decided upon at the first meeting of the State Council Three Gorges Project Construction Committee. Based on the spirit of that meeting, they first organized the experts for a preliminary evaluation and then the committee did an evaluation. For this purpose, the State Council Three Gorges Project Construction Committee Office invited 126 experts to form the Core Experts' Group and 10 special topic experts' groups. First, the special topics experts' groups evaluated 11 chapters of the preliminary design and then the Core Experts' Group was responsible for proposing an overall evaluation conclusion for the preliminary design.

At the evaluation meeting, the experts fully fostered technical democracy, seeking truth from facts, and conscientious responsibility in conducting enthusiastic discussions. They passed in principle the preliminary design and offered many very good opinions and proposals.

Big Deal Struck With Russian Electric Equipment Supplier

40100102 Beijing CHINA DAILY (Economics and Business) in English 20 Jul 93 p 2

[Article by staff reporter Zhang Yu'an]

[Text] A leading Chinese power developer yesterday struck a big deal with a Russian electricity equipment supplier in Beijing to import four Russian-made turbine generator units.

The more than \$100 million-worth contract was inked by the Huaneng International Power Development Corporation (HIPDC), China's pioneer in utilizing foreign funds to develop the power industry, and the A/O Energomashexport of Russia.

This is the fourth contract HIPDC has concluded to buy generators with the former Soviet Union and Russia since the company was founded in 1985.

The first three contracts were for power plants in Nanjing, Jiangsu Province and Shantou in Guangdong Province.

This time, the four units, including two generators each with a capacity of 140,000 kilowatts and another two units each with a capacity of 180,000 kilowatts, are for the use of the Beijing Co-Generation Power Plant, a joint venture project jointly financed by the Beijing municipal government and HIPDC.

The power plant, in the eastern part of Beijing, has a total investment of more than 4.6 billion yuan (\$807 million), including \$285 million in foreign funds.

It is expected to ease Beijing's winter power shortages as well as substantially improving the city's environment when it is put into operation in 1997.

Wang Defang, chairman of the HIPDC board, told yesterday's signing ceremony in the Great Hall of the People that the plant will be able to supply 4 billion kilowatt hours of electricity a year to the capital as well as providing heat to 20 million square metres of buildings, including the diplomatic area, and produce 5 million tons of steam an hour for industrial use.

Its central-heating system will help the city to sharply reduce pollution by removing 600 stacks.

Therefore, the project is also critical for Beijing's bid for the 2000 Olympic Games, Wang noted.

HIPDC also plans to build 8-12 million kilowatts more of electricity generation facilities by the end of this century to meet the rising demand for power resulting from China's rapid economic growth.

This huge project will require an estimated 40 billion yuan (\$7.01 billion) of funds.

HIPDC president Lang Chengwei says that to reach the goal it will utilize more foreign funds as well as encouraging overseas companies to cooperate with it on setting up joint-venture power plants.

By the end of last year, HIPDC had built 10 large thermal power plants with a total capacity of 5.8 million kilowatts. Of them, 5.6 million kilowatts electricity generating equipment was imported from Western countries with foreign loans, accounting for about 60 percent of the total funds spent on the projects.

Foreign Investment in Zhejiang's Energy, Transportation Projects

936B0103B Beijing RENMIN RIBAO OVERSEAS EDITION in Chinese 5 Jul 93 p 2

[Article by reporter Yuan Yaping [0755 0068 1627]]

[Text] Details from the recently concluded 1993 Zhejiang Province Investment Conference reveal that energy and transportation projects have become the projects of choice for foreign investors.

Zhejiang electric power projects have brought in over U.S.\$ 1 billion dollars. The French GEC Alsthom Corporation is very interested in the Zhejiang coastal No-1 and No-2 power plants, the Sanmen nuclear power plant, and the 2nd-stage Wenzhou power plant; and Corporation representatives told reporters, "Our Corporation has participated in joint venture projects to build power plants at Jiaxing, Taizhou and many other locations. We believe Zhejiang is an ideal piece of geography with great development prospects."

Transportation projects have also earned large long-term investments. The Hangzhou Transportation Bureau and the Hong Kong Tianxia Engineering Consultants Corporation Ltd signed a document of intent to build the Qian Jiang-3 bridge, a project of high local interest, for a total investment of U.S.\$ 92.33 million dollars, including an agreed foreign investment of U.S.\$ 55.4 million dollars. On the 23rd [of June], an industrial and commercial certificate was issued for the construction of a beltway beyond Huancheng Road in Hangzhou, for which the first foreign investment installment is expected shortly. The Hong Kong Zhengda Enterprise International Corporation will independently fund the Zhengda (Ningbo) Harbor Corporation in the Ningbo Economic and Technical Development Zone for a total investment of U.S.\$ 25 million dollars, for which a contract has already been signed. The U.S. Yushan Group and Taizhou have signed an intent agreement to join in a venture to build the Kanmen fishing harbor using U.S.\$ 28 billion in foreign funds.

A total of 1,343 project contracts were signed at the conference for total investments of U.S.\$ 6.173 billion.

Shanxi Energy Base: From Exporting Coal to Exporting Electricity

936B0092A Beijing RENMIN RIBAO in Chinese 26 May 93 p 1

[Article by reporter Wang Yisheng [3769 5337 3932]: "Shanxi Focusing on Coal, Power, Water, Railroads, and Highways: Doing Good Basic Facilities Construction, Spurring an Economic Takeoff, Building Railroads and Highways, Diverting the Huang He Into Shanxi To Aid Shanxi, Shifting From Transporting Coal to Transmitting Electricity"]

[Text] How can Shanxi, a state energy resource and heavy and chemical industry base area, make its economy leap up to a new stage? Shanxi Provincial Governor Hu Fuguo [5170 1381 0948] said on 24 May 1993 that during the next 5 years the current government will focus on four important matters: coal, electric power, water, and railroads and highways, to solve "bottleneck" problems and spur an economic takeoff.

Communication is a "bottleneck" that is restricting economic development in Shanxi. The Shanxi Provincial CPC Committee and Shanxi Provincial Government are focusing closely on railroad, highway, aviation, and other basic facilities construction. They have invested 1.52 billion yuan in construction of the six Shen-He (Shenchi-Hequ), Yang-She (Yangquan-Shexian), Xiao-Liu (Xiaoyi-Liucun), Wu-Mo (Wuxiang-Modeng), and Qin-Qin (Qinxian-Qinyuan), etc. local railroads running a total length of 487 kilometers and they have built and opened to traffic 319 kilometers. The Shen-He railroad, running a total length of 138 kilometers, was opened to traffic in May 1993, and construction of the Taiyuan Railway Station expansion project got underway in April 1993.

The pace of highway construction in Shanxi has also been speeded up. Construction has already begun on the expressway from Taiyuan to Jiuguan, which is being built through a joint investment by China and the United States. The Shanxi Shanxi-United States Expressway Company Ltd. was established on 18 May 1993 and State Council vice premier Zou Jiahua [6760 1367 5478] attended the founding conference. This major passageway to the east for the outward shipment of Shanxi's coal is also China's first mountainous region expressway and it will link Shijiazhuang, Beijing, Tianjin, and Tonghai Harbor. Construction has also been accelerated on four grade 1 and 2 highways from Taiyuan to Yuci, Dongguan to Changzhi, Fenyang to Liulin, and Yuncheng to Fenglingdu running for a total length of 406 kilometers.

Construction got underway in early March 1993 on the new lounge building at Taiyuan Airport. This huge project involving a total investment of 450 million yuan will give a new face to Taiyuan Airport. After it is fully completed, it can handle 60 takeoffs and landings a day and will have a passenger handling capability of 2 million people a year.

Shanxi has serious water shortages. With approval from the State Council and State Planning Commission, there was a formal start on construction of the project at Wanjiashai to divert the Huang He to Shanxi on 22 May 1993. This is a measure for a fundamental solution to the water shortages in the Taiyuan, Shuozhou, Datong, and other regions. In addition, construction of the water diversion project at Nanzhuang on the Hutuo He will solve Xinzhou Basin's water shortages and Taiyuan City's water supply problems. Construction of the Qin He Irrigation District project will solve the water supply problems of industry and agriculture in the Linfen Basin. Construction of the Yumenkou water lifting project will solve the water supply problems of industry and agriculture in the Yuncheng region.

To change from transporting coal to transmitting electricity, Shanxi will also build the Yangcheng No 1 Power Plant, whose first-phase project will have a total installed generating capacity of 2,000MW and transmit power to Jiangsu, and the Yangcheng No 2 Power Plant, whose first-phase project will have an installed generating capacity of 2,000MW and transmit power to Guangdong. It will also build the Hequ Power Plant first-phase project and Shentou Power Plant second-phase project, each with an installed generating capacity of 1,200MW, and it will build the Yangquan No 2 Power Plant with an installed generating capacity of 300MW.

During the next 8 years, Shanxi Province will concentrate its forces on 12 strategic projects related to communication, farmland construction, coal, electric power, water conservancy, and so on. The province has decided to focus on 35 key projects involving a total investment of 6.36 billion yuan. Construction of these projects is now being speeded up. Their completion will effectively promote reform and opening up in Shanxi and spur a leap of Shanxi's economy up to a new stage.

New Surge in East China Power Construction

936B0097A Shanghai WEN HUI BAO in Chinese
7 Jun 93 p 1

[Article by Hu Weiqiang [5170 0251 1730] and Chen Guibing [7115 2710 0393]]

[Text] In order to break through the bottleneck in power supply, and to ensure continual rapid economic growth of the East China region, an unprecedented construction surge is now happening in the East China Power Grid. According to plan, by the end of this century, the East China Power Grid will reach a total power generation capacity of 55 million kilowatts, and will become a modern, logistically distributed, structurally multi-mode, generation-transmission integrated and comprehensive power grid based on 600,000-kilowatt generators and 2.4 million kilowatt thermal power stations complemented by nuclear power, hydroelectric power, and imported power from outside the region.

The East China Power Grid has long been shouldering the task of supplying power to Shanghai Metropolitan

City, Jiangsu Province, Zhejiang Province, and Anhui Province. Since the mid and late 1980's, seven thermal power stations each of million-kilowatt capacity level, have been built, and the capacity of each power generator has increased from 125,000 kilowatts to 306,000 kilowatts. During that time period, the nation's first domestically-designed, manufactured and tested Chinsan Nuclear Power Station, and the nation's first two 600,000-kilowatt supercritical power generators at the Shedongkou No. 2 power station were completed, plus other engineering projects of international advanced levels. At the end of 1992, the total installation capacity of the power grid reached 30.71 million kilowatts and has become the nation's largest inter-province-city power grid.

After the 14th National Party Conference, Shanghai, Jiangsu, Zhejiang and Anhui experienced a sustained period of high and rapid economic growth unprecedented in the history of the region, thus throwing the power supply and demand dilemma of the region sharply into focus. Though the Power Grid last year generated an additional 3.04 million kilowatts of power, a record increase, it still fails to meet the power needs of the rapidly growing region. According to experts' forecasts, the East China Power Grid by the year 2000 will reach a power consumption of 25.20 million kilowatts and will reach a maximum load of 41 million kilowatts, an increase of 130 and 150 percent respectively, over the figure at the end of the Seventh 5-Year Plan.

Based on the changes in the East China Power Grid and to ensure that the East China Power Grid has enough room for future expansion, the newly formed East China Power Group Company made the timely move of modifying the Eighth 5-Year Plan and the Ninth 5-Year Plan for the Power Grid. The new additional power generation capacity for the two periods as planned originally, respectively 10 million kilowatts and 14 million kilowatts, were increased to become 11 billion kilowatts and 21 million kilowatts respectively. The goal is to shoot for a total installed capacity of 55 million kilowatts by the year 2000. To achieve this goal, the East China Power Group Company has picked certain spots along the East China coastal area, and along the lower and middle course of the Chang Jiang as power generation sites to build large thermal power stations of 2.4-million-kilowatt-plus capacity equipped with 600,000-kilowatt power generators.

At present, the Group Company and the local power companies of the three provinces and one city are now working hard to stay on schedule in Phase II of seven large power stations located in Yangzhou, Shidongkou, Beilungang, Jiaying, Waigaoqiao, Nanjing and Qinshan, a total of 14 power generators each of 600,000 kilowatts; and also in the preliminary work of Phase II of seven power stations located in Ligang, Nantung, Lohe, Huaibei, Pengcheng, Wenzhou and Hefei, a total of 15 power generators, each with a capacity of 300,000 to 350,000 kilowatts. Moreover, the East China Power Grid will continue its effort to develop new hydroelectric power

stations on the basis of accelerating the work on the Tianfongping reservoir power stations. Also, the Power Grid will continue to work hard to stay on top of the Sanmenwan Nuclear Power Station preliminary work as a basis for the advent of the nuclear power development in the next century. At the same time, the East China Power Grid is also making active preparations to receive imported power from outside the region and to work hard to implement as soon as possible the plan to import power from the Three Gorges and from Yangcheng of Shanxi Province.

Northwest To Add 5.9 Million Kilowatts in Installed Capacity in 8th FYP

936B0093A Beijing RENMIN RIBAO in Chinese
27 May 93 p 1

[Article by reporter Jing Xianfeng [2529 7145 1496]]

[Text] Xian, 26 May—In 1992, new operating installed capacity on the northwest network reached the highest level in history and this year, investments in electric power construction reached over 3.7 billion yuan, surpassing any previous year. This illustrates the vigor of electric power construction in the five northwest provinces.

The big factor in prolonged retardation of the economic development of the northwest has been the slow pace of electric power development and electrification of towns, villages, and agricultural households. At the end of 1985, the total installed capacity of electric power entities in the five northwestern provinces was only 5,894MW. Since the Seventh 5-Year Plan, the people of the northwest, long deprived of electric power, gave priority to electric power construction as the means to reduce the "East West gap", and ascend new economic heights. In the 7 years since 1986, the five northwest provinces, while lobbying for national support, made the most of local investments and raised the capacity of the northwest network to double that of the Sixth 5-Year Plan. Last year, 1,750MW of large and middle-sized installed generating capacity became operational, turning a glossy new page in the history of northwest electric power.

The Eighth 5-Year Plan, now in progress (1991-1995), will add 5,907MW in installed capacity to the northwest network, more than the cumulative growth of electric power in the five provinces in the several decades prior to 1985. In line with the new idea of "transporting electric power instead of coal to reduce transportation pressures", the Northwest Electric Power Administrative Bureau, along with the large hydropower projects such as Lijiaxia, is also making preparations to build large pit-mouth power plants to get them up and running in the Ninth 5-Year Plan.

Big Energy Base Taking Shape in Taizhou

936B0092C Shanghai JIEFANG RIBAO in Chinese
24 May 93 p 5

[Article by special reporter Zhang Ke [1728 4430]: "Big Energy Resource Base Area To Rise Up at Taizhou,

Development Program and Part of the Project Design Passes Experts' Committee Evaluation"]

[Text] The Zhejiang Sanmen County Electric Power City Comprehensive Development Regulations Work Program and Taizhou Power Plant Fourth-Phase Expansion Project Preliminary Design passed an experts' committee evaluation on 21 May 1993. Taizhou's Sanmen Bay, Taizhou Bay, and Leqing Bay are now gradually forming a unique large energy resource base area in China.

Taizhou Prefecture has superior geological and geographic conditions and is extremely rich in all types of electric power resources, so it is an ideal site for building large thermal power plants and nuclear power plants. Among its total energy resources, tidal energy accounts for 40 percent of the total in China. The prefecture now has a total installed electric power generating capacity of 940MW and generates over 5.4 billion kWh of electricity a year. Besides the 250MW supplied to the region and its own load, the remaining portion is transmitted into the East China Grid. Taizhou Power Plant now has an installed generating capacity of 750MW and ranks second in all of Zhejiang Province. The scale of the fourth-phase expansion project is two 300MW generators at a total investment of about 2.2 billion yuan. Taizhou Prefecture is dotted with hydropower stations that have a total installed generating capacity of 96.8MW. In addition, an integrated grid "wind-diesel" supplementary energy resource system has been completed through cooperation with the European Community on Dachen Island and an experimental tidal energy station that ranks first in China and third in the world has been completed at Jiangxia in Wenling. Taizhou Prefecture has also been taking new steps in the areas of power transmission and transformation projects. It has now built two 220 kV power transformation sites, ten 110 kV power transformation sites, and 54 35kV power transformation sites and circuits running for a total length of more than 9,200 kilometers that have formed an integral Taizhou Grid, and they are involved in doing preparatory work for three large comprehensive energy resource mini-regions at Sanmen Bay, Taizhou Bay, and Leqing Bay.

According to the inspections and discussions by over 100 units including the Ministry of Energy Resources and several 100 experts covering several years, Sanmen Bay could build two 4 X 1,000MW large nuclear power plants and two to four 2,400MW large thermal power plants. It could also build tidal energy power generation plants at three locations. Among them, Sanmen Thermal Power Plant, which will have 2,400MW, has now entered preparatory engineering and Maotoushan has been selected as the construction site for a large 4 X 1,000MW nuclear power plant. The Sanmen Electric Power City Program Outline designed by the Zhejiang Provincial Economic Planning and Design Academy has passed evaluation by experts.

Evidently, after gradual development of the comprehensive energy resource mini-regions in Taizhou's three bays, they will have a total installed generating capacity of 18,000MW to 20,000MW and generate as much as 120 to 140 billion kWh of electricity yearly, which is equivalent to the total installed generating capacity in the entire East China Grid.

Zhejiang Develops Thermal, Nuclear, Hydro, Wind Power Resources

936B0107B Beijing RENMIN RIBAO OVERSEAS
EDITION in Chinese 7 Jul 93 p 2

[Article by reporter Shen Haixiong [1957 3189 7160]]

[Text] Zhejiang Province, long suffering from the power crunch and shortage, stuck to the multi-mode approach to developing sources of power and made full use of its numerous coastal deep harbors, numerous rapid streams and windy climate. By the end of 1992, total installed capacity of generators of over 500-kilowatt capacity in the province reached 6.126 million kilowatts and annual power generation reached 27.8 billion kilowatt-hours.

Zhejiang Province has numerous deep water harbors along its coast and has the advantages for developing large-scale thermal power plants and nuclear power stations. The completion of the Beichongjiang power station in 1991 based on 600,000-kilowatt power generators ushered Zhejiang Province's power industry into

the era of "large generators and large power stations." The completion of Qinshan's 300,000-kilowatt nuclear power generator and its feeding into the grid ended a chapter in the history where there was no nuclear power in China.

Along the coast of Zhejiang Province, there are abundant wind resources. At present, four experimental wind-powered generation sites have been completed in the Shengsi and Dachen islands of the Zhoushan Archipelago. Each of the power stations has an installed capacity of about 1,000 kilowatts.

The nation's first power station that made use of tidal differential and its potential energy to generate power, the Wenlingjiangxia tidal power station, now has a total installed capacity of 3,200 kilowatts. The Tianfangping reservoir power station at Anji, now under construction, which will make use of water pumped into the reservoir to generate power, has a total installed capacity of 1.8 million kilowatts and, when completed, will become the nation's largest domestically designed pumped-storage hydropower station. Moreover, pumped-storage type hydroelectric power stations such as the 80,000-kilowatt Xikou station in Ningbo, the 200,000-kilowatt Shuangfeng station in Ninghai, and the 1.2 million-kilowatt Tongbo reservoir power station in Tiantai, all use the same principle of pumping water into a reservoir to generate electricity.

300MW Hangzhou Plant Passes Feasibility Study

936B0111B Hangzhou ZHEJIANG RIBAO in Chinese
9 Jul 93 p 1

[Article by reporter Meng Yabin]

[Text] The Wangjiangmen thermal power plant in Hangzhou, built to cut down environmental pollution and to save energy, passed feasibility study on 7 July.

The soon-to-be-built Wangjiangmen thermal power plant is the province's largest thermal power and heat plant built as a joint enterprise and is also one of the important infrastructural projects in Hangzhou. The project is a three-party joint enterprise of the province's Power Development Company, Hangzhou City Economic Construction and Development (Group) Company, and Hongkong Oriental Overseas Development (China) Company Limited. Total planned installation capacity of the power plant is 300,000 kilowatts. Phase I of the project consists of the building of two 50,000-kilowatt thermal power generators at an investment cost of 800 million yuan. Work is expected to begin next February and will be operational in 1995 and 1996 respectively.

When the Wangjiangmen thermal power station is completed, thermal power and electricity are jointly produced and heat energy is concentrated in supply. It can replace numerous existing low-efficiency and high-pollution small industrial furnaces in Hangzhou city. This will greatly reduce sulfur dioxide emissions and other pollutants, reduce atmospheric pollution and improve the environmental conditions of the people in Hangzhou and the investment conditions in Hangzhou. When Phase I of the project is completed and operational, annual power generation will reach 650 million kilowatt-hours. This will relieve the power crunch in Hangzhou city.

Neimenggu Power Network Steps Up Pace of Generator Installation

936B0111A Beijing JINGJI RIBAO in Chinese
21 Jun 93 p 5

[Article by reporters Liu Anqi, Ke Qiban, and Li Kexin]

[Text] The Neimenggu power network steps up pace of generator installation with work on 13 power generators (2.52 million kilowatts) started soon after an agreement was signed in April between the City of Beijing, the Ministry of Power Industry and Neimenggu Autonomous Region to develop jointly power generation in the region.

According to the three-party agreement, Neimenggu will deliver 220,000 to 330,000 kilowatts of power to the City of Beijing this year and will deliver 1.1 to 1.5 million kilowatts in 1995 and 5 million kilowatts by the year 2000. This will ensure that Beijing will not have brown-outs and power limitations. In an effort to implement the

plan, the Neimenggu Power Company revised its construction plan and focused efforts in key projects that would supply power to Beijing. According to the new power grid plan, key projects to be put operational this year include: 200,000-kilowatt generator units No. 3 and No. 4 of Fengzhen power plant, the 100,000-kilowatt No. 2 generator at Jungar power plant and the 50,000-kilowatt No. 4 generator at Weiliuhe power plant. By the end of the year, total installed capacity in the power network will reach 2.04 million kilowatts and will export to Beijing 330,000 kilowatts. Projects to be completed and operational in 1994 include the 330,000-kilowatt No. 1 generator of the Dalad power plant, the 200,000-kilowatt No. 2 generator of the Fengzhen power plant, the 100,000-kilowatt No. 1 and 2 generators at the Bohaiwan power plant and the first 50,000-kilowatt generator at the Hohhot power plant. Total installed capacity will reach 3.02 million kilowatts and 800,000 to 1.1 million kilowatts will be delivered to Beijing. Projects to be completed and put into operation in 1995 include the 330,000-kilowatt No. 2 generator unit of the Dalad power plant, the 200,000-kilowatt No. 6 generator of the Fengzhen power plant, the 200,000-kilowatt No. 3 and 4 generators of the Jungar power plant and the 200,000-kilowatt No. 3 generator of the Bohaiwan power plant. Total installed capacity in the power network will reach 4.2 million kilowatts and 1.5 million kilowatts will be delivered to Beijing.

To ensure the smooth running of the engineering projects and on time completion according to schedule, Neimenggu Power Company, under the full government support of the Neimenggu Autonomous Region, adopted a series of extraordinary measures and gave top priority to the engineering projects for the supply of power to Beijing in terms of manpower resources, financial resources and material resources. Under the capital crunch, the company "sacrificed the soldier to save the general." The company put on the sideline engineering projects which are unrelated to the supply of power to Beijing and put the limited financial resources on the key projects; 80 million yuan were squeezed from production as liquid cash for procurement of materials for infrastructural needs. At the same time, the Neimenggu Power Company reinforced management of the engineering projects. The senior management of the company led working groups to the key engineering sites and worked on the sites and helped solve the problem on sites with the engineers. At present, the company has, through various channels, raised 600 million yuan for the key engineering projects. This basically ensures that the construction will proceed as planned. Key engineering projects are on schedule and some of them are ahead of schedule. The Jungar plant No. 2 generator, which was expected to be operational in July/August, is expected to be operational by the end of June and be able to supply power to the network. By that time, power supplied from the Neimenggu power network to Beijing will jump from 220,000 kilowatts to 330,000 kilowatts.

Accelerating Reform of Hydropower Design and Investigation System

936B0085 Beijing SHUILI FADIAN [WATER POWER]
in Chinese No 3, 12 Mar 93 pp 3-6

[Article by Zhu Erming [2612 1422 2494] of the Central Water Conservancy and Hydropower Survey and Design Academy: "Liberate Ideas, Transform Mechanisms, Accelerate Reform of Water Conservancy and Hydropower Survey and Design"]

[Text] **Abstract** Extensive reform in China's water conservancy and hydropower survey and design units in 1993 is at a critical instant. To adapt to the market economic system, the objective of their reform is to implement a shift toward becoming enterprises. This article suggests the need to liberate ideas and transform the "three concepts"; adopt measures to increase the dynamics of reform; transform mechanisms, give primacy to dealing properly with the technical economics contractual responsibility system; be concerned with S&T and personnel, augment strengths, improve competitiveness; it also proposes preparatory work tasks for 1993.

Key terms: survey and design, intensive reform, transformation of mechanisms, preparatory work tasks for 1993

The year 1993 is the first year of intensive reform in China based on the goals of the socialist market economic system. Our water conservancy and hydropower construction and preparatory work is in a key period for completing the Eighth 5-Year Plan. In this new year, the question of how water conservancy and hydropower survey and design work can make intensive reform and what are the tasks of survey and design have become the concern of our colleagues. I offer the following summarization based on the spirit of the 1993 National Water Conservancy and Hydropower Work Conference.

I. Liberate Ideas, Transform Concepts, Meet the Needs of the Market Economy

A. We must change our concept of design from simply performing duties to the state to a concept of service to proprietors

Looking at the overall environment of reform of the capital construction management system and investment management system, the implementation of reform of the capital construction management system and investment management system centered on a proprietor responsibility system is now intensifying. Premier Li Peng has pointed out clearly that in accordance with the principle that enterprises are independent accounting administrative entities, proprietors should have overall responsibility for projects. They implement full-process responsibility and bear the responsibility for investment risks running from planning, raising capital, design, and actual construction of a construction project to production management, repayment of loans and

interest, and guaranteeing the value and increasing the value of state-owned property. To adapt to the establishment of a construction project proprietor responsibility system, in accordance with the principle of a separation of government from enterprises, government management of investments in the future will mainly involve reinforcement of macro control, doing good unified planning, formulating policies, organization and coordination, inspection and supervision, promulgating information, providing services, and so on. Moreover, we must also establish a socialized consulting services system in which service to proprietors, consulting, and design are the primary factors and a construction market system in which construction and equipment and materials supplies are the primary factors.

In the past, we implemented a socialist planned economy that involved the state's control of water and development of power while design academies performed their duties on behalf of the state in doing survey and design work properly. Now, we have multi-channel, multi-level, and varied arrangements for controlling water and developing power and the state has given proprietors the authority to control water and develop power. Thus, design academies must establish a concept of service to proprietors and listen to the needs and views of proprietors. In the future, funds for hydropower preparatory work will also be raised through multiple channels and units responsible for designs will sign contracts with investors in gradually commercializing design achievements. Inspection of preliminary designs for large and medium-sized electric power construction projects will also shift gradually to inspection organized by proprietors. Thus, we must establish the concept of service to proprietors.

B. We must shift from relying on state directive plans to relying on the concept of the market

As the investment system is reformed, the state's key construction projects will always be limited and there will be fewer and fewer directive-type plans as well as a corresponding reduction in the amount of directive-type tasks in preparatory work. Thus, the target of services by design academies must change from relying mainly on the state to the market. This means that in the future key state projects will also gradually foster the role of market mechanisms and implement solicitation of bids for construction projects, with the proprietors implementing solicitation of bids or negotiated bids to determine the winning units. Of course, for water conservancy and hydropower preparatory work we have accumulated over a long period basic information on natural geography, and there are complex relationships within and outside of river basins, upstream and downstream, across provincial and national boundaries, and among all departments in comprehensive utilization, so some unique problems require joint discussions by proprietors and administrative departments. Survey and design units should on the one hand establish a concept of serving the state and proprietors and respect the decisions and views of proprietors, and on the other hand

their design products should meet market requirements, which means meeting the needs of investors, this being the key point. Without investors, design products cannot be sold. Thus, establishing projects for water conservancy and hydropower preparatory work requires unified arrangements integrated with medium and long-term plans and the economic requirements of the market.

C. We must make a conceptual transition from equality, dependence, and demand to participation in competition

The only way out for design academies is path-breaking, moving toward the market, participating in competition, and striving for existence and development in competition. They must rely on high-quality, good reputation, technologically advanced, and marketable products to take over the market. Otherwise, they will be eliminated through intense market competition. They must overcome the ideological concepts of equality, dependence, and demand and boldly open up the domestic and international markets. They must transform their internal administrative mechanisms, overcome egalitarianism in allocation, dare to carry out allocation based on the results and value of labor and innovation, dare to award large bonuses, and allow some people to become prosperous first.

II. To Accelerate the Pace of Reform, Survey and Design Units Must Change From an Institutional System to an Enterprise System

The goal in reform of China's engineering survey and design industry is to change from an institutional system to an enterprise system to turn them into S&T-type enterprises that make their own administrative decisions, have responsibility for their own profits and losses, and practice self-development and self-restraint, and to change from the uncompensated use of survey and design products to compensated use, achieve the commercialization of survey and design technical achievements, transform design organizations into enterprises, and industrialize design management. During the process of 14 years of reform, in objective terms we have pushed survey and design units toward the market, given them the fundamental characteristics of enterprises, and prepared the preliminary conditions for changing from an institutional system to an enterprise system. In 1992 the Ministry of Construction proposed its "Views Concerning Certain Questions in the Shift From an Institutional System to an Enterprise System in Engineering Survey and Design Units" and submitted it to the State Council where it is awaiting approval. These "Views" call for starting in 1993 in comprehensive implementation of an enterprise system and implementation of matching policies for enterprise design fee collection standards and other enterprise systems; implementation of a separation of government and enterprises and comprehensive implementation of a technical economics contractual responsibility system; shifting from calling design units "academies" to calling

them "companies" after implementation of the enterprise system, with the provision of four models for selection: 1) A consulting design and advisory company model; 2) An engineering company model; 3) An industry group model; and 4) A specialized design management institute model. Engineering survey units will change into rock and soil engineering companies in accordance with the design enterprise model and based on their own functions and conditions, and their external services can develop toward exploratory drilling companies, comprehensive companies that jointly manage basic processing, pile driving, vibration and percussion, and so on. The overall goal is for the survey and design industry to change from an institutional system to an enterprise system and all must enter the market, participate in competition to allow the best to gain victory and the inferior to be eliminated, and seek existence and development in competition. 1) They must look toward themselves and, under the conditions permitted by policies, implement a technical economics contractual responsibility system, become involved in transforming internal administrative mechanisms, and implement a linkage with the benefits of work; 2) They must continue adhering to the principles of "focusing on one industry, extending both heads, and economic diversification," open up the scope of their administration, set up companies and entities, and increase the strengths of design units; 3) After the State Council approves the "Views" of the Ministry of Construction, survey and design units must implement an enterprise system as quickly as possible; 4) Design academies having the proper conditions should actively join group companies, create better conditions for providing services to the groups and rely on the groups' advantages to participate in debt management, and develop themselves further; 5) They must convert S&T achievements into forces of production, develop shareholding management, make full use of their technical advantages, select good points, find proper markets, adopt shareholding arrangements including preparatory work expenditures, construction supervision and management expenditures, and S&T achievement application expenditures, have their own capital, raise capital from employees, borrow loan debts, and so on to participate in shareholding construction of medium-sized and small hydropower stations; 6) Design enterprises with the proper conditions should implement shareholding system trials to create experience for reform of the property ownership system.

III. Transform Administrative Mechanisms, Implement a Technical Economics Contractual Responsibility System

The "Regulations on Transformation of Administrative Mechanisms in Industrial Enterprises in the Public Ownership System" issued by the State Council provided a legal foundation for transforming administrative mechanisms in enterprises. The "Regulations" point out that administrative mechanisms are being transformed to spur enterprises to enter the market and become commodity production and management units that make their own management decisions, are responsible for

their own profits and losses, and practice self-development and self-restraint in accordance with the law to turn them into independent enterprise legal persons with civil authority and responsibility for civil duties. The government must transform its functions, reform the mode of enterprise management, and straighten out relationships between enterprises and government. Enterprises must be given administrative decision-making rights, the authority to determine the value of products and labor services, product marketing rights, materials purchasing rights, import/export rights, investment decision rights, capital allocation rights, property disposition rights, joint ventures, merger rights, labor hiring rights, personnel management rights, wage and bonus allocation rights, organizational establishment rights, and apportionment refusal rights. The responsibility of enterprises for their own profits and losses and their legal responsibilities have been clarified. They must adhere to and perfect the contractual administrative responsibility system. The overall goal is to liberate and develop the forces of production.

Survey and design units changing from institutional units into enterprise management to implement the "Regulations" means that survey and design units must be pushed toward the market and change the institutional system to an enterprise system, and the "Regulations" are a huge propelling force for the achievement of this type of reform. We must conform to the great tide of reform, take the initiative in self-consciously "taking the plunge," and in a situation in which policies matching the reform are to come forth, we must actively fight for support from all areas, implement a technical economics contractual responsibility system, transform internal administrative mechanisms, and work for more intensive reform.

Recently, the Ministry of Construction drafted and studied the "Methods for Implementation of a Transformation of Administrative Mechanisms in Survey and Design Units Under the Public Ownership System" while the Ministry of Energy Resources did the same for the "Certain Stipulations and Opinions Concerning Adhere to Regulations in Implementing Decision-Making rights in Electric Power Enterprises." The Central Water Conservancy and Hydropower Planning and Design Academy also studied the "Certain Opinions Concerning Adherence to Regulations in Implementation of a Transformation of Administrative Mechanisms in Survey and Design Academies Under Its Direct Jurisdiction." The main aspects were: design academies have the right to make their own decisions regarding the proportions of all types of funds among after-tax profits in accordance with the relevant state stipulations; they have the right to make their own decisions regarding prices with the exception of fee collection standards set by the state for directive-type tasks; they can implement the relevant stipulations of local governments; they have the right to use every possible route to enter the international market; they have the right to make their own administrative decisions, part-time designing is controlled at one-half of the base figure for their checked and

ratified income, and they are allocated at specific proportions to individuals and not included in their total wage bill; the central academy will no longer assign employee number plans, and design academies can make their own determinations of the number and arrangements for personnel based on their work requirements; after implementing a contractual responsibility system, one-third of the increase in their total wage bill can be used to increase the recorded wages of personnel who make contributions and large bonuses can be given to personnel who make prominent contributions; design academies can do their own appraisals of all levels and all categories of technical duties and tenure qualifications based on their post establishment and evaluation situations, implement a separation of appraisal and recruitment, and so on. It was decided that design academies under the direct jurisdiction of the ministry can begin on 1 January 1992 in trial implementation of a technical economics contractual responsibility system and adopt a contractual responsibility arrangement involving contractual responsibility for turning over profits (income taxes) to higher authorities and linking their total wage bills with income and actual taxes and profits.

IV. Focus on S&T, Focus on Qualified Personnel, Improve the Competitiveness of Survey and Design Units

A water conservancy and hydropower survey and design market is now gradually taking shape in China, and the essence of market competition is S&T competition and qualified personnel competition. The focal point of competition is concentrated on product quality and reputations. Survey and design achievements have a direct impact on engineering benefits and product quality, so to improve the quality of survey and design we must focus on S&T progress, focus on equipment deployments, and focus on qualified personnel training.

1. Focus on new technology development, focus on hardware equipment. "Use quality to fight for existence, use the new to achieve victory." For survey and design, developing new technology in particular requires attention to the development of computer-aided design software and information management technology, which means technical upgrading of our traditional production modes. Starting in 1993, we must gradually shift the focus of computer work from a focus on development onto the track of combining development and extension, and try to turn mature software into industrial production capacity as quickly as possible, and rationally and properly use technical equipment capital and production development capital to gradually install advanced hardware.

2. Focus on qualified personnel training and utilization. We must be concerned with importing and training skilled personnel who understand technology, management, and foreign languages. Without management personnel, we cannot open up international markets, and without people with foreign language skills it is very

difficult to open up international markets. We must be willing to invest and adopt the sending of people abroad and inviting people to China, let elderly experts be leaders, and set up special topic discussion classes, study in production practices, and various other training routes. We must be concerned with the development of qualified personnel and love skilled personnel. In 1993 we must undertake advanced and labor model evaluation and selection work, reward the advanced, establish a set of award systems, and dare to give significant bonuses to elderly experts who have made prominent contributions and to top technical people. During 1993 the state should also evaluate and select a group of survey and design masters, superior quality survey and design academy directors (managers), superior quality survey and design projects, and superior quality survey and design software. This is very important work.

3. We must be concerned with selecting personnel having boldness and knowledge, which means understanding specialized technology and knowing how to manage and administer, for appointment to leading organs at all levels. We should be especially concerned with discovering skilled managerial and administrative personnel from among middle-aged and young key technical personnel, strengthening their training and tempering, and allowing them to play an even greater role.

V. Water Conservancy and Hydropower Preparatory Work Tasks for 1993

1993 is the third year of implementation for the 10-Year Program and Eighth 5-Year Plan. The overall objectives and tasks in the water conservancy area are: accelerate comprehensive control of major rivers and concentrate forces to build several comprehensive utilization large key water conservancy projects that will have a profound impact on sustained, stable, and coordinated development of our national economy. We must reinforce planning, survey, and design work and focus on the relevant preparatory work for the two large century-spanning projects at the Three Gorges and diversion of water from south to north China. On the basis of completing the compilation of plans for the seven large river basins, focus on planning work in key regions and on key tributaries; do good feasibility research work for the Songliao project to divert water from south to north China, the Huai He channel to the sea, the large Liushu, Manla, Baise, and other key water conservancy facilities; accelerate preliminary design inspection and project establishment work for the Jiangya, Zipingpu, and several other key projects; arrange for nearly 150-plus planning, feasibility research, and preliminary design and preparatory work projects; do good construction on control of the Huai He, Taihu, Xiaolangdi, Wanjiazhai,

Huang He diversion to the Wei He, Taolinkou, Guanying, Feilai Gorge, and other key projects, and create the conditions for moving up to a new stage in water conservancy construction.

In the hydropower area, based on the needs of the market economy in 1993, we must accelerate development of the electric power industry, especially active development of hydropower; resolutely adhere to the principle of adapting to local conditions and developing large, medium-sized, and small-scale projects, integrate with market requirements in carrying out cascading and rolling development, and accelerate preparatory work for large and medium-sized hydropower stations. During the Eighth 5-Year Plan, 1993 is the year of the largest scale of new construction starts in hydropower construction and a year of continued increases in the scale of hydropower placed into operation, with a planned 12,050MW of electric power planned for operationalization, including a total of 14 large and medium-sized hydropower generators going into operation for 3,140MW. Added to over 1,000MW in large and medium-sized hydropower, a total of more than 4,000MW of hydropower will go into operation in 1993. We plan to start construction on a scale of 20,670MW at 34 projects in 1993, including six hydropower projects for 9,160MW, and to arrange for 23 reserve projects with 22,202MW, including eight hydropower projects with 2,200MW.

Based on the "Views Concerning Arrangements of Hydropower Preparatory Work During the Last 3 Years of the Eighth 5-Year Plan," plans during 1993 have arranged for eight projects and we plan to complete five projects; 17 feasibility research projects with 32,290MW and plan to complete four projects with 3,240MW; and 22 preliminary design projects for 21,090MW and planned completion of three projects for 4,900MW. In addition, we also have preliminary designs for eight supplementary projects with 7,100MW. In 1993, this includes the listing of one new planning project, seven feasibility projects for 4,660MW, and nine preliminary design projects for 5,320MW. Plans by local areas have made arrangements for over 110 planning, feasibility research, preliminary design, and other preparatory work projects.

The tasks for intensive reform, production tasks, spiritual civilization construction, and so on are extremely numerous in 1993. We must continue conscientious adherence to the spirit of comrade [Deng] Xiaoping's speeches during his tour of southern China and the 14th CPC Central Committee and, based on the related deployments of the Ministry of Energy Resources and Ministry of Water Resources, liberate our ideas, unify our understandings, and work together to make new contributions to opening up a new situation in water conservancy and hydropower preparatory work.

State Approves First Medium-Sized Hydropower Station on Upper Reaches of the Huang He

936B0096A Xining QINGHAI RIBAO in Chinese
5 May 93 p 1

[Text] The first middle-sized hydropower station on the upper Huang He, the Zhiganglaka hydropower station, has just been approved and scheduled by national authority. This is the first middle-sized hydropower station for the development of hydropower resources on the upper Huang He in Qinghai and it opens the door for development and construction of local hydropower resources.

Zhiganglaka hydropower station, located on the boundary of Jainca and Hualong counties on the upper reaches of the Huang He in Qinghai Province, is the first of seven middle-sized hydropower stations that can be built within the province, and according to the official response from the State Planning Commission, the total installed capacity of the station will be 150MW, and its annual average output will be 667 million kWh. Once built, it will help stimulate the local economy, relieve the power shortage in Qinghai, and kick off the economic development of the upper Huang He corridor. After the scheduling of the hydropower station, the Provincial Water Conservancy Department took the judgements and findings of the feasibility report and opened up discussions with the Huangnan Autonomous Zhou Government, and Haidong Business Office and other relevant departments concerning joint-ventures for construction.

Joint Investment in "Little Three Gorges" Project

936B0091A Lanzhou GANSU RIBAO in Chinese
20 May 93 p 1

[Article: "Gansu Province Signs an Agreement with Canada's Longyuan Company for a Loan To Build the Jiudian Gorge Hydropower Station, a Joint Investment Project To Develop Hydropower in the "Little Three Gorges"]

[Text] The "World Journal" and "Xingdao Daily" published in Toronto, Canada reported recently that, in response to an invitation from Canada's Longyuan Group, a delegation from the Gansu Provincial Water Conservancy Department and Gansu Provincial Electric Power Bureau visited Canada from 12 April to 3 May 1993 and signed the relevant agreements with the Longyuan Group for cooperation to build Jiudian Gorge Hydropower Station and joint investment to develop the "Little Three Gorges" hydropower project on the Huang He. Chinese Consul General Tang Fuquan [0781 4395 3123] in Toronto commended the "close cooperation between China and Canada, which is also an indication that cooperation between Gansu Province and Ontario Province has proceeded very smoothly over the past year." Consul General Tang "highly commended" the "efforts to promote Sino-Canadian cooperation" and the "major contributions" of the Longyuan Group's deputy executive director Peng Anna [1756 1344 1226].

A report in the "World Journal" on 24 April 1993 stated that the plan for Jiudian Gorge Hydropower Station is a plan of China and Canada to develop China's energy resources. The project got underway in 1991 and its completion is expected in 2002. The total investment is 1.2 billion yuan renminbi. Mr. (Hesha) manager of the Ontario Provincial Electric Power Bureau, the world's fourth largest public utility, said that "the Jiudian Gorge Hydropower Station project is the largest project that they have participated in with China to date."

While visiting Canada, the Gansu Provincial Water Conservancy Department (Party A) reached a supplementary agreement with Canada's Longyuan Group Company (Party B) on 3 May 1993 which stated clearly that "Party A authorizes Party B to raise a loan of \$120 million from the Canadian Government and other international financial organizations to be provided to Party A for use in construction of the Jiudian Gorge Key Water Conservancy Facility on the Tao He in Gansu." "Party B will provide a loan of \$120 million at an interest rate no greater than 5 percent that will be computed as simple interest." "Both parties have agreed that within 7 years of the date that the loan contract takes effect, a total loan of \$120 million will be used. Party A plans to complete the preliminary design for the project during 1993 and 1994 and Party B has agreed that starting from the day the loan contract takes effect, \$10 million of the loan will be used by Party A for expert consultations, the preliminary project design, training in foreign countries, and so on. The broad time limits for the loan are calculated from the day the loan contract takes effect and cover a total of 8 years. The loan repayment schedule is computed after the broad time limit for the loan concludes and covers a total of 20 years." Party A and Party B signed the Jiudian Gorge Hydropower Station Agreement establishing a joint investment company for a joint hydropower station development project.

The "World Journal" and "Xingdao Daily" also gave optimistic reports concerning the establishment of a Sino-foreign cooperative enterprise by the China State Energy Resource Investment Company, Gansu Provincial Electric Power Company, and Canada's Longyuan Group Company for a joint investment to develop and manage the Daxia Gorge, Xiaoxia Gorge, and Wujin Gorge (called the "Little Three Gorges") hydropower stations on the Huang He in Gansu and stated that this was the "first instance of China cooperating with foreign investors in the hydropower area" and that "it can bring prosperity to Gansu Province, which has long suffered from drought disasters."

According to the draft agreement signed by the four parties in Toronto on 27 April 1993, the total investment in construction of the "Little Three Gorges" hydropower project from 1991 to 2000 when it is completed in its entirety and placed into operation (construction of the Daxia Gorge project got underway in 1991 and it will be completed and placed into operation in 1997) will be 2.5

billion yuan renminbi (including 1.0 billion yuan renminbi for Daxia Gorge). The joint management company will first develop and manage Daxia Gorge Hydropower Station. The registered capital of the four parties in the joint management company as a proportion of the total investment will be 45 percent from the China State Energy Resource Investment Company, 20 percent from the Gansu Provincial Electric Power Construction Investment and Development Company, 5 percent from the Gansu Provincial Electric Power Company, and 30 percent from the Canada Longyuan Group Company.

The agreement also states that "the four parties in the joint management agree unanimously to authorize the Gansu Electric Power Company to be responsible for construction of this project and for production management and administration, and to sign a contractual responsibility contract and production and management authorization contract with the Gansu Electric Power Company based on the project quality requirements, schedules, total project investments, and management principles passed by the board of directors." The total joint venture period for the "Little Three Gorges" is 1991 to 2015, for a total of 25 years.

First Unit at Manwan now Operational

936B0100A Beijing RENMIN RIBAO OVERSEAS EDITION in Chinese 30 Jun 93 p 1

[Article by reporter Ren Weidong [0117 4850 2639]]

[Text] Kunming, 29 Jun—Yunnan's Manwan hydropower station with 1,500MW installed capacity, which has been under construction for 8 years, turned on its first 250MW unit on 27 June a.m. It will be a great relief to Yunnan's serious power shortage, will make sending western power eastward to Guangdong a reality, and will boost the development of the Lancang Jiang.

The Manwan hydropower station is Yunnan's biggest investment project since the new China was established and is also China's first 1,000MW-class hydropower station undertaken as a joint venture between central government and local partners; a key national project testing a combination of public bidding and construction monitoring. It is located at the boundary of Yun and Jingdong counties in Yunnan and is one of the large-scale cascade power stations planned for the Lancang Jiang. It will generate up to 7.76 billion kWh annually, and it is being built in two stages. The first, with 5 units totalling 1,250MW, is scheduled for completion in 1995.

Qingtongxia Update

936B0091B Yinchuan NINGXIA RIBAO in Chinese 21 May 93 p 1

[Article by Zhao Jingquan [6392 2529 3123], Yang Zhaoxing [2799 0340 5281], and Chen Hongying [7115 4767 4964]: "Construction Begins at Tangqu Hydropower Station"]

[Text] The foundation was laid amidst the roar of bulldozers for construction of the Qingtongxia Tangqu Hydropower Station project on 8 May 1993.

Because of the continual expansion of the irrigated area in the Hexi region of Ningxia and the continual increase in the irrigation flow rate in Hexi's Tanglai Canal, an average of only 2 billion cubic meters of water that had not been used for power generation could be used for farmland irrigation, which is equivalent to the amount of water impounded and released in 1 year at a medium-sized reservoir. Former Ministry of Water Resources minister Qian Zhengying [6929 2973 5391] said sorrowfully: "the rivers flow to the east, and everything flowing along is coal and oil." This huge waste of energy resources has attracted the attention of leaders in all areas. With approval from the State Planning Commission and other departments, the Tangqu Hydropower Station project was included as an expansion project for the Qingtongxia Hydropower Station project. This project will be built via a joint investment by the Ningxia Electric Power Bureau and Qingtongxia City. The power station will install three 10MW axial flow rotating vane-type water turbine generators, a 40 kVA main transformer, and an outgoing circuit that will connect with the Qingtongxia Hydropower Station 110 kVA switching station for linkage with the power grid. The primary operating mode of the power station is power generation during the irrigation season, with the water flowing into the canal ahead of the large dam and after passing through the power plant where it will generate electricity, the tailwater will flow out into Tanglai Canal to irrigate farmland. After Tangqu Hydropower Station is completed, it will generate 86.80 million kWh of electricity a year, which is equivalent to annual savings of 50,000 tons of standard coal. Its completion can also increase the reliability of irrigation from the Hexi Main Trunk Canal.

The Ministry of Water Resources and Ministry of Electric Power Northwest China Survey and Design Academy are responsible for the design of the Qingtongxia Tangqu Hydropower Station project and the Ningxia Electric Power Bureau's Electric Power Structural Installation Engineering Company will implement overall contractual responsibility for its construction. It is expected that it will formally generate power on 1 July 1995.

Dachaoshan Update

936B0096C Kunming YUNNAN RIBAO in Chinese 25 May 93 p 1

[Article by Zeng Lingyin [2582 0109 6892]]

[Text] The Dachaoshan hydropower station construction project was approved by experts on 22 May, moving an important step closer to scheduling construction.

The Dachaoshan hydropower station, which will have 1,350MW installed capacity and generate up to 7,021 billion kWh per year, and is to be built following the

Manwan project, passed preliminary examination in March of this year. This multi-purpose project will entail construction of a long penstock, a subterranean power plant, and reinforced compressed-concrete dam. The Ministry of Electric Power and Water Conservancy Bureau's Beijing Prospecting Design Academy did the early-stage geological prospecting. The station proprietor will be the Yunnan Electric Power Bureau, and the Manwan Administrative Bureau will be the construction element.

The appraisal team of the China International Engineering Advisory Corporation has been entrusted by the State Planning Commission to conduct a fair, scientific, and factual appraisal of the thoroughness of design, investment environment, and construction conditions. It is considered that construction of Dachao Shan will go a long way to advance the development of the rich hydropower resources of the Lancang Jiang, improve the national energy structure, enrich the Yunnan economy, and help Yunnan export electricity. Its suitable scale, quick turnover, excellent economic indicators, technological feasibility, and good investment climate provide the conditions favorable for national approval and scheduling. Upon return to Beijing, the appraisal team will promptly deliver the appraisal report to national authorities.

Guangzhou Pumped-Storage Station Update

936B0100B Beijing RENMIN RIBAO OVERSEAS EDITION in Chinese 30 Jun 93 p 1

[Article by reporters Lei Zhongyu [7191 0112 0056] and Zhang Chaoxiang [1728 2600 4382]]

[Text] Guangzhou, 29 Jun (XINHUA)—The Guangzhou 1,200MW installed capacity pumped-storage hydropower station recently completed a test run of its first unit, and on 29 June it began normal operations.

The Guangzhou pumped-storage hydropower station, located in the hills of Conghua County in Guangzhou Municipality, 90 kilometers from Guangzhou, is a joint venture construction project of Guangdong Province, the National Energy Investment Corporation, and Guangdong Nuclear Power Investment Corporation. Guangdong Province's investment makes up 54 percent, and its two partners invested 23 percent each. Four 300MW water-pump generating units, built by the French (Alstom?) Corporation, will be installed in the 1st-stage construction, for which France has granted a U.S.\$ 200 million dollar loan. The power station was designed by the Guangdong Water Conservancy Survey and Design Academy, and the China Hydropower Station Engineering No-14 Bureau has the contract for the main construction and facilities installation.

This power station is being built to complement the Daya Bay nuclear power plant, and is mainly for adjusting the low and peak loads on the Guangdong grid. The station operates between high and low reservoirs; its

subterranean penstock system and power plant systems are completed; and its water head drop is 535 meters.

With approval of the State Council, the construction of the power station began on 26 September 1988, and debugging of the 1st unit was completed less than 5 years later in June 1993. The other three units of the 1st-stage construction have reached the installation and testing stage.

The Guangzhou pumped-storage hydropower station, when completed, will go a long way to relieving the power shortage on the Guangdong grid, and will improve the power supply structure as it adjusts low and peak loads on the grid.

Development of Qinghai Portion of Upper Reaches of the Huang He

936B0099A Beijing RENMIN RIBAO in Chinese 9 Jun 93 p 1

[Article by reporter Hu Taichun [5170 1132 2504]]

[Excerpts] [passage omitted] Not long ago, reporters went to the snow-capped Qinghai plateau along the upper Huang He, and were deeply moved by the outstanding achievements of the people to develop the hydropower resources there.

When the 13 large and middle-sized power stations are built, their installed capacity of 11,000MW may be generating 36.5 billion kWh per year.

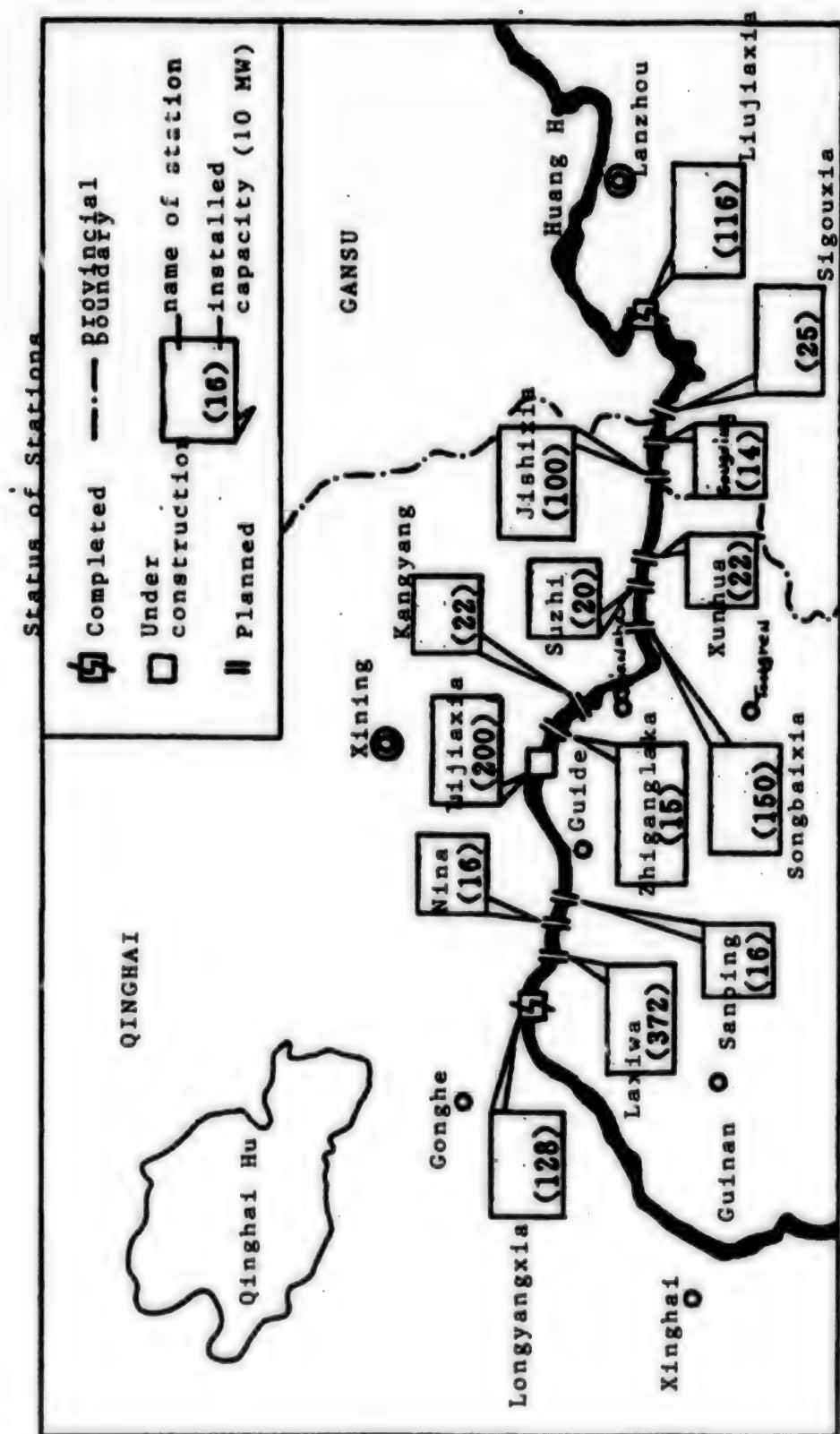
The source of the Huang He is 5,000 meters above sea level, its drop, by the time its waters leave Qinghai at Sigouxia is 2,800 meters. Such a drop forms a hydropower resource of estimable value. It is 276 kilometers downstream from Longyangxia to Sigouxia, the water drops 865 meters, electric power will be concentrated, there will be little inundation damage, there is great promise for multi-purpose uses, and a good number of large and middle-sized cascade power stations can be built there. [passage omitted]

In 1954, the Huang He Planning Committee Conference published the "Huang He Comprehensive Utilization Plan Technical Economics Report", which was assessed and passed by the Second Session of the First National People's Congress, specifying the policy that electric power was to be the primary purpose for the development of the segment from Longyangxia to Sigouxia. In 1983, the Northwest Survey and Design Research Academy again issued the "Huang He Mainstream Longyangxia to Qingtongxia Segment Cascade Development Plan Report", proposing to build six large cascade hydropower stations at Longyangxia, Laxiwa, Liji Xia, Songbaixia, Jishixia, and Sigouxia. Soon after, seven more middle-sized cascade hydropower stations were planned for this "Golden Waterway". It is foreseen that if these 13 stations are built, the total installed capacity could be up to 11,000MW and their power output could average 36.5 billion kWh per year. [passage omitted]

On 11 April this year, the first slab of concrete was poured for the dam footings of the large-scale Lijiaxia hydropower station. The Upper Huang He Hydropower Engineering Bureau Chief, Yang Jianhua, told reporters: The completion of the Longyangxia hydropower station will supply the electric power for Qinghai and the northwest region as required by the Seventh and Eighth 5-Year Plans, and the Lijiaxia will supply that required by the Ninth 5-Year

Plan. Its construction introduces the 2nd stage of opening the upper Huang He hydropower resources. This power station will be a multipurpose water conservancy project whose main purpose is to generate electricity. Its total installed capacity will be 2,000MW, and its average annual output will be 5.9 billion kWh, which in the near term will supply electricity for the northwest network. It is also programmed to send power to north China.

HYDROPOWER



Unit 5 of Shajiao A Joins Grid

936B0107A Guangzhou NANFANG RIBAO in Chinese
29 Jun 93 p 1

[Excerpts] Unit 5 of Shajiao A power plant's 300,000-kilowatt generator completed a 72-hour full-load trial run the day before yesterday and completed a 24-hour trial run yesterday. Today, the generator unit operates normally in both generating power and inputting power into the grid.

Unit 5 of Shajiao A power plant is a high-capacity, high-automation generator unit which presents

technical difficulties to build. The design, construction, installation and testing of the generator unit was undertaken by the Provincial Power Generation Design Institute, the 1st Engineering Bureau of the Provincial Power Supply Engineering Department, the Provincial Thermal Power Supply Installation Company, the Provincial Power Testing and Research Institute and the Shajiao A power plant. [passage omitted] At present, Phase I and Phase II of Shajiao A power plant, with a total installed capacity of 1.2 million kilowatts, are now fully completed.

Shenfu Dongsheng Now Has Capacity of 10 Million Tons Per Year

936B0104A Beijing RENMIN RIBAO in Chinese
14 Jun 93 p 1

[Article by reporter Xiao Jiabao [5618 1367 0202]]

[Text] Shenfu Dongsheng coal field, China's largest confirmed coal field, is under full-scale construction. The coal field already has the capacity to produce 10 million tons per year, and construction for a planned 30 million capacity per year is now in progress. Preparations are in the making for an eventual output capability on a scale of 60 million tons per year.

Shenfu Dongsheng coal field, located in northwest Shaanxi and southern Inner Mongolia, has confirmed reserves of over 230 billion tons of coal, one-fourth of all confirmed reserves in China, and is one of the eight largest coal fields in the world. The quality of the coal is excellent and extraction conditions are superlative. Central authorities have often expressed their desire to have this coal field ready around the turn of the century to become the country's extra-large energy reserve base, and bring to fruition the national go west for energy policy.

Construction and extraction at Shenfu coal field is unlike anything in the past, in integrating mines, roads, power, ports, navigation, production, supply and sales, into a unified system, the Huaneng Refined Coal Corporation

operates a systematized program with systematically organized construction and systematic production management guided by the laws of market economics. The estimated total investment for construction is 33 billion yuan (at 1990 unchanged costs over a 20-year construction period).

The more than 10,000 employees of the Refined Coal Corporation, taking full advantage of new systems, started out with high requirements, high technology, high quality, and high profits, and after 8 years of hard work, built, on this remote and barren land, a maze of roads and railways, a host of extra-large modernized mines with high production, high efficiency, and comprehensive extraction facilities at Daliuto, Shigetai, Bulianta, and Shangwan. The Huojitu mine with a 5 million ton-per-year production capability, just under construction this year, is fully equipped with imported facilities, an efficient work force, at operating costs that are first-rate in the country.

More than 300 kilometers of highway traverse the mining district; The 170-kilometer Baotou to Shenmu rail line with a 10 million ton-per-year hauling capacity is open to traffic, tracks are now being laid for the segment of the 270 kilometer Shenmu to Shuozhou rail line that lies within Shaanxi, and construction of the control system will begin within the year; the dedicated port at Huanghuagang with a cargo handling capacity of 30 million tons of coal per year is also being readied for construction.

Major Progress Claimed in Offshore Oil, Gas Geological Work

936B0092D Beijing RENMIN RIBAO OVERSEAS EDITION in Chinese 10 Jun 93 p 1

[Article by reporters Qian Xuekai [6929 1331 0418] and Zhu Youdi [2612 1635 2769]: "Major Progress in Oil and Gas Geology Research in East China Sea, Projected Total Reserves of Several Billion Tons of Petroleum and Several 100 Billion Cubic Meters of Natural Gas"]

[Text] Important advances have been made in oil and gas geological research in China's East China Sea, new breakthroughs have been made in understanding the geology of several important structural zones in the East China Sea continental shelf basin, and three-dimensional seismic processing, well logging methods, and other integrated oil and gas survey and evaluation technologies have been developed and applied.

Since a high-output industrial oil and gas flow was obtained during drilling in the East China Sea Pinghu structural zone in 1983, high-output oil and gas wells have come into being almost every year in the vast East China Sea. Geological exploration has already discovered a huge structure—the Yuquan structure—covering an area of 640 square kilometers with over 30 fault lines in the northern section of the Xiling structural zone and drilling has already produced industrial oil and gas flows. The experts feel that it is very possible that a "golden triangle" of petroleum and natural gas may exist in the south-central part of the Xihu depression.

Geophysical surveys and exploratory drilling over an area of 260,000 square kilometers on the East China Sea continental shelf have led to the discovery of the Chang Jiang depression, Xihu depression, and several other favorable oil and gas-bearing structural elements and a few oil and gas deposits have been discovered. The experts predict that the total petroleum resources in the East China Sea may reach several billion tons, with several 100 billion cubic meters of natural gas.

New Oil and Gas Geochemical Prospecting Method

936B0093B Beijing ZHONGGUO KEXUE BAO [CHINESE SCIENCE NEWS] in Chinese 28 Apr 93 p 1

[Article by Yi Shan [1355 1472]]

[Text] Zhu Ming [2612 6400], a researcher at the CAS Institute of Geology has proposed a new geochemical method for oil and gas exploration: Measuring changes in the proportion of helium and argon isotopes, and the combinations of helium, argon, and hydrocarbons (oil and gas) in near-surface soils to ascertain the extent and depth of oil and gas deposits. It is a cheap and effective, time and labor saving, scientific technique that does not require complex facilities.

For 3 years, Zhu Ming, Huo Weiguo [7202 5898 0948], and Zhang Fusong [1728 4395 2646] have tested this method at two locations at Shengli oil field, and its prediction results, compared with other geochemical prospecting methods, turned up even more new finds, overall. Most recently, this approach was examined and accepted by the Shengli oil field geological prospecting departments, who consider it to have "significant long-range value for improving survey of prospective geological structures." Cooperative efforts will continue to get instruments to the oil field's geochemical prospecting units in the field so that they will have another tool to apply directly to survey operations.

The rare gases, helium and argon, are evenly distributed in the atmosphere, but oil and gas deposits contain 2 to 4 times the amount of helium as does the atmosphere, it being an element inherent in oil and gas deposits, that is produced, migrates and gets distributed along with the oil and gas. Helium is inert and unaffected by subterranean physical, chemical, and biological activity, and can pass through several thousand meters of the earth's crust to emerge on the surface. It is an ideal geochemical indicator for the early formation of oil and gas deposits, and can reveal fissures and hydrocarbon anomalies in deeper strata. There is less argon in oil and gas deposits than in the atmosphere, but because the argon-40 that emanates from the surrounding rock is constant, the proportion of argon-40 and argon-36 isotopes is higher than that of the atmosphere, and therefore the changes in the ratios of argon and argon isotopes present among soil gases can reflect subterranean accumulations of hydrocarbons, and the extent of enclosure rock and rock cover. It was further learned that under many conditions, the abundance of helium and ratios of argon isotopes are a conjugal indicator showing that helium, argon, and hydrocarbons have an inseparable interrelationship. According to the variations in combinations of these three components, a scientific judgment can be made as to the extent of distribution, depth, oil-water environment, density of structure, and existence of fissures in a survey area.

The measuring of changes in the presence of helium in surface soils as a geochemical prospecting aid has been done in the U.S. for over a decade, and has been used somewhat in China in recent years, but the successful application of the argon-isotope ratio method, and the overall helium-argon geochemical method have not been done anywhere before. This new helium-argon geochemical prospecting method for finding oil and gas was an outgrowth of Zhu Ming and others participating in the national Seventh 5-Year Plan S&T project, "Forecasting gaseous emissions from coal mines," to predict the depth, distribution and timing of gas emissions, and it has wide prospects for future use in predicting the location and depth of coal gas emissions.

Big Infusion of Funds for South China Sea Natural Gas Development

936B0099B Beijing RENMIN RIBAO OVERSEAS
EDITION in Chinese 28 Jun 93 p 1

[Text] Beijing, 26 Jun (XINHUA)—On 26 June, the Industrial and Commercial Bank of China issued a loan of U.S.\$ 530 million in foreign exchange for the Sino-foreign cooperative development of the South China Sea "Ya 13-1" natural gas project.

The "Ya 13-1" natural gas field was discovered in June 1983 in the South China Sea as result of a cooperative oil and gas prospecting effort by the China National Offshore Petroleum Corporation, the U.S. Amoco Corporation, and the Kuwait National Petroleum Corporation. Sino-foreign and authoritative world organizations assess the gas field's reserves at up to 100 billion cubic meters, the largest gas field found in Chinese waters thus far. When completed and operating, the field can produce 3.4 billion cubic meters of gas annually for 20 years. The plan is for the gas field to formally begin supplying gas to Hong Kong in 1996 at the rate of 2.9 billion cubic meters per year. It will also supply 500 million cubic meters per year to Hainan Province.

The construction quality requirements for the "Ya 13-1" gas field are very high, and it is a huge project and a huge undertaking. Construction includes many platforms, an 800-kilometer submarine pipeline to Hong Kong, a 100-kilometer submarine pipeline to Nanshan, Hainan, and several auxiliary projects. The total investment for construction is several billion U.S. dollars.

It is also reported that the Industrial and Commercial Bank of China's foreign exchange credit will be keyed to support technological reform of large and middle-sized enterprises and basic industrial development for energy, transportation, and telecommunications.

Breakthrough in Junggar Oil and Gas Exploration Reported

936B0103A Beijing RENMIN RIBAO OVERSEAS
EDITION in Chinese 5 Jul 93 p 2

[Article by reporters Chai Huaiji [2693 2037 0679] and Wang Baiyu [3769 0130 3842]]

[Text] The Xinjiang Petroleum Administrative Bureau, exercising a grand tradition of battling through, assembled several thousand hands to brave the Junggar Basin, and achieved great successes in oil and gas exploration.

According to seismic prospecting data, the Xinjiang Petroleum Administrative has again found some dozen new oil fields and four new oil bearing systems, and in a 9,000 square kilometer area from Chepaizi eastward to Xiasijie, a reserve of over 200 million tons of heavy oil was discovered.

These discoveries extend the reach of Karamai oil field by 4 to 5 times, and raise its annual output of crude from

4 million to over 7 million tons. By 1992, the Karamai oil field prospecting and development area was pushed eastward from the northwest rim of the basin by more than 270 kilometers to the range of Xiasijie, Mosouwan, and Shiyintan in the central desert of the Junggar Basin. Oil and gas exploration in the eastern Junggar Basin has also been busy and productive. The newly established Junggar East Corporation has uncovered nine oil and gas fields, in recent years, in a 35,000-square-kilometer prospecting area, including Huoshao Shan, Beisantai, Mazhuang, and Cainan, a confirmed oil and gas field of over 150 square kilometers, in which four of the oil and gas fields are under construction and may have a total crude oil output capability of 2.5 million tons.

Seventeen Foreign Companies Bid on Exploration of East China Sea

936B0100C Beijing RENMIN RIBAO OVERSEAS
EDITION in Chinese 2 Jul 93 p 1

[Article by reporter Qin Jingwu [4440 0079 0562]]

[Text] The 4th round of public bidding and voting for China's offshore petroleum wound up at 1610 on 30 June with 17 petroleum corporations from seven countries: the U.K., U.S., Japan, Korea, Denmark, Netherlands, and Italy, delivering their price quote reports to the China National Offshore Petroleum Corporation. It is abundantly evident that the prospects for oil and gas exploration in the coastal waters of the East China Sea are excellent.

Bids were sought for an area covering 72,800 square kilometers, divided into northern and southern sections, the northern section of which is located 230 kilometers east of Shanghai, and the southern section 110 kilometers east of Wenzhou, Zhejiang. Conditions for exploration in those areas are excellent, as in recent years, China's Ministry of Geology and Mining and the Offshore Oil Corporation conducted explorations there and found very good signs of oil and gas indicating a bright future for oil and gas development in the area.

The foreign corporations are saying that China's reform policy, the oil and gas potential of the East China Sea, and China National Offshore Petroleum Corporation's good reputation, were inducements for them to join in the bidding.

Beginning in July, the China National Offshore Petroleum Corporation will begin cost assessments and discussions with the foreign corporations, and it is expected that contracts will be signed within the year, and at-sea exploration will begin next year.

There are now eight oil and gas fields in production in Chinese waters, and 10 others under construction that will be coming on line in due course. In 1997, offshore oil and gas production will reach an annual output of 12 million tons of crude oil and 4 billion cubic meters of natural gas. Foreign cooperative exploration in the East China Sea will increase back-up reserves and oil and gas

production, and will stimulate the economic development of Shanghai and the general southeast coastal area.

Head of China Petroleum and Natural Gas Corporation Paints Rosy Future

93B0104B Beijing RENMIN RIBAO OVERSEAS
EDITION in Chinese 12 Jul 93 p 2

[Article by Yan Xuchao [0917 4872 2600] and Chen Xinhua [7115 2450 5478]]

[Text] China National Petroleum and Natural Gas Corporation President, Wang Tao, told a German "Commercial News" reporter, Peter Saidelici [romanization], recently, that Chinese mainland and foreign petroleum corporations may engage in many forms of cooperative ventures.

Wangtao, addressing the matter of foreign cooperation for oil in the Tarim Basin, said the 560,000 square kilometer Tarim Basin, one of the largest oil-bearing sedimentation basins in China, is one of the few areas in the world that has not been thoroughly explored. To date, six oil fields ready for exploitation, and 18 commercial-grade oil bearing structures have been found there. China has opened a reserve base and is constructing essential facilities. A rail line is now open to Korla, an airfield has been built, and there are good telecommunications that can reach anywhere in the world. There is intense interest in exploration in the area, as 68 petroleum corporations from 17 countries have responded to calls for bids.

In addressing the question of using foreign funds and outside economic and technical cooperation, Wang Tao said China's petroleum industry mainly relies on its own finances, technology, and strengths, but may at the same time actively employs foreign funds, and is broadening economic and technical cooperation with foreigners. Cooperating for resources has been extended from the 11 southern provinces to the 10 northern provinces, cities and autonomous regions, including resource-rich Heilongjiang, Shandong, Xinjiang, and Gansu. Not only is there cooperation with foreign corporations in oil and gas explorations, but Daqing, Shengli, and Liaohe oil fields are cooperating with foreign corporations in oil field development and in raising extraction rates. In respect of cooperative financing, China will continue to welcome and use foreign government and public medium- and long-term preferred loans. In engineering and technology, China will continue to pursue many forms of cooperation in oil field and pipeline construction, oil and gas production operations, natural gas processing and utilization, and petroleum machinery, instruments and meters manufacturing, including the establishment of cooperative joint venture enterprises. Recently China signed a contract with the U.S. (Haliburton?) Corporation for a joint-management well-completion company, and a joint venture for production of downhole detonators. Talks are also going on with other foreign corporations to expand cooperation in

these areas. Preparations are being made to sign a series of new joint venture projects. The present situation of the Chinese petroleum industry is very encouraging. Wang Tao said China is quite rich in oil and gas resources. In recent years China has organized all sorts of technicians and used modern oil and gas resource assessment technology and methods, and for some years has carried out oil and gas reserve assessments throughout the country. The estimated petroleum reserves for the whole country is 78.7 billion tons, and natural gas reserves are 336 trillion cubic meters. Of this, oil on the mainland is 62.7 billion tons and natural gas, 306 trillion cubic meters. China has been expanding its prospecting for some time now, and as geological exploration penetrates deeper into the earth it is likely that former survey figures will rise.

The German reporter asked how China's oil and gas resources compare with Saudi Arabia's. Wang Tao replied that from estimates by various countries, Chinese oil and gas resource reserves are about 10th in the world; Saudi Arabia is first. From one point of view, Tarim's oil and gas reserves are not far behind those of Saudi Arabia, but that may be wishful. Of course, China's confirmed oil and gas reserves are only a small part of the estimated reserves, and the development potential is great. China is one of the world's main producers of petroleum. In the last 2 years, the annual output of crude oil has been steadily in 5th place in the world. Last year, China produced 142 million tons of crude oil, of which 138 million tons was on the mainland, while offshore oil was 3.87 million tons. In the last 5 years, China's petroleum development situation has been quite good in comparison with the world's chief oil producing nations. Based on China's oil and gas potential, in order to meet the needs of national economic growth, there will be further intensified oil and gas prospecting and development. Initial plans are for continental crude oil and natural gas output to reach 200 million tons by 2000. Offshore production will also increase.

When asked about export of crude oil and natural gas from Tarim, Wang Tao replied that that was a very good question in which there is wide interest. The three great Xinjiang basins, Tarim, Turpan-Hami, and Junggar, are China's most promising growth area. To speed development of oil and gas reserves in Xinjiang, China's transportation sector is stepping up multiple-track construction of the Lan-Xin Rail line. At the same time, the China National Petroleum and Natural Gas Corporation is planning to build a northwest crude oil long-haul pipeline, and a long-haul gas pipeline within Xinjiang's border to guarantee export of oil and gas. Preparations for the resource base for the long-haul crude oil pipeline are now underway, for which the feasibility study is completed. Efforts are now underway to actuate that feasibility and get the project scheduled. The decision has been made to call for bids for foreign corporation to build the pipeline. This way, China can use foreign advanced technology, facilities and pipeline experience

to build a highly automated crude oil pipeline with a high level of management and good economy.

Shengli Relies on Science and Technology To Increase Output

936B0093C Beijing ZHONGGUO KEXUE BAO
[CHINESE SCIENCE NEWS] in Chinese 24 May 93 p 1

[Article by reporter Liu Quanrui [0491 5425 3843]]

[Text] China's 2nd-largest oil field, Shengli oil field, relies on S&T for strength of reserves, volume of production, and profitability. In recent years, the oil field has put over 60 million yuan annually into scientific research and advanced testing. Of its 124 achievements during last year alone, 12 were judged to be of advanced international level and 72 were at advanced domestic level. Crude oil output was steady at 33 million tons, which was a big help in realizing the national petroleum industry policy of "Stabilize in the east and develop in the west."

To assure reliability of reserves to sustain production levels, emphasis was focused on the importance of precision in prospecting through the dissemination and perfection of advanced prospecting techniques, such as the use of trimetric and vertical seismology methods, and the measuring of oil deposits in sandstone, and it has gained momentum in understanding subterranean oil-bearing structures and changes in oil and gas distribution. Ever year, tens of millions of tons of new geological reserves are discovered, and major advances are made in petroleum geology theory and oil deposit engineering technology.

To meet the demands on oil field prospecting and development, new research and application of advanced drilling technology goes on constantly to raise well drilling speed and quality. High-pressure jet drilling technology, directional and multiple-well technology are technical contributions the oil field has made to oil well drilling in China that have increased well drilling rates and profitability. The oil field is also hot on the heels of the new international hot-button technologies and leading the country in research and application of "horizontal well" drilling technology. Shengli oil field has drilled 11 of the 18 "horizontal wells" drilled in China so far, and has formed up a full-scale "horizontal well" drilling technique that has excellent prospects for wide-spread use.

In recent years, research has also been focused on developing a series of full-scale technologies to combat the existing high water problem, and for the exploitation of the complex oil deposits in old oil fields. The heat-extraction technology for heavy oil has been accomplished, making the extraction of heavy oils, originally very difficult, easier and it has increased the output of crude oil more than 1.8 million tons per year. The application of the policy of "controlling water to stabilize oil" by using water throttling, profile adjusting, and large-hole plugging techniques has reduced the volume of water in oil wells. After years of struggle, prospecting

in the shallow seas in the mouth of the Huang He is now possible, and this has made continued output possible and opened up new operations.

Even as problems continue to worsen, all-round advances in S&T are keeping production steady, and annual crude oil production remains at over 33 million tons, making Shengli China's 2nd largest oil field. Even more importantly, relying on advancements in S&T has become the collective will of over 180,000 oil field workers, including 20,000 technicians.

Big Qinghai Natural Gas Project Gets Under Way

936B0096D Xining QINGHAI RIBAO in Chinese
3 May 93 p 1

[Article by Liang Zixiang [2733 3419 4382] and Ling Xubin [0407 7312 2430]]

[Text] After 2 years of full preparations, the early-stage work for tripartite natural gas project of the Qinghai Petroleum Bureau to open up the Qaidam gas field, get Qinghai's economy moving, and assist construction in Tibet, has been proceeding smoothly. The three parts of the natural gas project will be undertaken by the China National Petroleum and Natural Gas Corporation and Qinghai Province. They include: 1) gas field development and construction - develop the Sebei No. 1 and No. 2 structures and the Tainan structure; 2) gas pipeline - lay a 245-kilometer-long pipeline from Sebei and Tainan to Golmud that will transport 1 billion cubic meters of gas per year; and 3) multiple-use of natural gas - build a natural gas plant for multi-purpose use at Golmud. It will be built after the Golmud oil refinery, and will be another large key project to develop the Golmud petrochemical industry. Wang Tao, President of the China National Petroleum and Natural Gas Corporation, has often emphasized that the tripartite Qinghai natural gas project will greatly improve backward operations, develop the natural gas chemical industry, increase economic performance of oil fields, and also carry out the policy of "3 highs and 1 low" (i.e., high automation, high level management, high efficiency, and low manpower), and create a modern gas field.

According to the Petroleum and Natural Gas Corporation, in April 1991, the Qinghai Petroleum Bureau established a tripartite natural gas project team to do the early stage work ahead of schedule, and do the overall development work. After 2 years of effort, the following tasks were completed: the Qinghai Petroleum Bureau Prospecting and Development Research Academy and the Sichuan Petroleum Bureau Prospecting and Development Academy jointly published the "Sebei, Tainan Gas Field Feasibility Report;" the Qinghai Petroleum Bureau Tripartite Project Office and Sichuan Gas-Field Design Academy published the "Gas Field Surface Construction Feasibility Report," "Sebei-Golmud Gas Pipeline Feasibility Report," "Comprehensive Sebei Natural

Gas Development and Utilization Project Advanced Feasibility Report," and the "Sebei, Tainan Natural Gas Development and Utilization Project Plan;" the Qinghai Petroleum Bureau finished the "Qinghai Tripartite Natural Gas Project Chemical Products Market Analysis and Forecast." In order to solve the difficulties of loose sandstone gas fields, the Qinghai Petroleum Bureau Downhole Operations Office and the Sichuan Petroleum Bureau Drilling and Extraction Technology Research Institute jointly completed the "Sebei Throttling Technology Test Summary Report." The Shengli oil field's Sand Control Center published the designs for the "Coiled Fiber Sieve Tube Gravel Packing Sand Control" and "Ceramic Sand Filter Pipe To Control Sand" designs, and also made arrangements to work with the Qinghai Petroleum Bureau's Downhole Operations Office. Meanwhile, the Qinghai Geology Brigade was conducting its major surveys, and the Canadian NOVA Corporation was carrying out its pipeline feasibility research. Sound and meticulous early-stage work has provided an important scientific basis and has laid a solid foundation for tabling the tripartite natural gas project of the Qinghai Petroleum Bureau.

Curtain Goes Up on Wenzhou Petroleum Base

936B0105A Hangzhou ZHEJIANG RIBAO in Chinese
20 Jun 93 p 1

[Article by reporter Shen Limin [3088 0448 3046]]

[Excerpts] On 18 June, foundation work began on the Wenzhou Petroleum Base in the Longwan area of the East China Sea, preparing the stage for large-scale development of oil and gas resources there. [passage omitted]

The East China Sea Wenzhou petroleum base is the 4th supply base operating at sea, following the Bohai Tanggu base, the South China Sea Shenzhen-Shekou base, and the Zhenjiang base. It will fill the gap in the east coast area, and give China a complete supply service system on the sea from north to south. The advent of the Wenzhou base also demonstrates that the fourth round of bidding for outside cooperation in China's offshore petroleum operations has matured with quality.

Chinese and foreign geologists all foresee that the East China Sea continental shelf is virgin territory ripe for the development, and brimming with optimism about its oil

and gas reserves. On 1 July 1992, the State Council approved the project, and the China National Offshore Petroleum Corporation's announcement to the world of the fourth opening of bids for foreign cooperation got the attention of the world's major petroleum corporations. More than 70 foreign petroleum corporations have made enquiries about bids, and more than 20 have made purchases of materials. The voting period will end on 30 June, and beginning in July, there will be a period for reviewing bids and signing contracts, then exploration activities will begin.

From last July's on-site surveys and site selection to the start of construction took only 11 months. Wenzhou is the closest port city to the prospecting area, and preparations for every phase of the activity are being made. Last August, with requisite approvals from the China National Offshore Petroleum Corporation, the decision was made by the East China Sea Offshore Petroleum Corporation and the Wenzhou Municipal Government to set up the East China Sea Wenzhou petroleum base, and the Wenzhou participants began to make major preparations. The Municipal Government decided that the Longwan 150-meter deep-water pier and 22,000 square meters of space would be used for the base, and plan to complete enlarging the pier base in the 2nd half of this year. The Municipal Government also set aside 150 mu of land at Zhuangyuanzhen in the Longwan zone to be used for building the base. The existing ground facilities of Wenzhou airfield, close by and suitable for helicopter service, will be used for supplying the well drilling platforms. Next year, the Wenzhou airfield will be opened to international flights. The Municipal Government is also holding discussions with foreign commercial interests for a cooperative food supply service for the various foreign petroleum corporations. This May, U.S., U.K., Japanese, and Australian oil corporation representatives made special trips to Wenzhou to check out the supply base situation, and they were favorably impressed.

The East China Sea Wenzhou Petroleum Base Corporation, and China National Offshore Petroleum Well Survey Corporation's Wenzhou Branch Corporation, and the Wenzhou Offshore Petroleum Development Corporation were also established during the commencement ceremony.

Work Begins on Phase Two of Qinshan

936B0101 Shanghai JIEFANG RIBAO in Chinese
7 Jun 93 p 1

[Article by reporter Zhang Zhiyuan [1728 5268 6678]: "Construction Begins on Second Phase of Qinshan Nuclear Power Plant Project, North and South China Join Hands To Build China's First 600MW Nuclear Power Generators, Shanghai Will Be Responsible for Building Three-Fifths of All the Equipment"]

[Text] A breakthrough-type takeoff is now occurring in China's nuclear power industry: the second phase project at Qinshan Nuclear Power Plant approved by the State Council with its associated roar of blasting to clear away mountains in the Qinshan region has now formally entered the construction stage. The Shanghai Power Plant Equipment Manufacturing Base Area has assumed responsibility for the task of attacking key problems in developing the primary nuclear island equipment for the two 600MW nuclear generators and all of the auxiliary equipment for the conventional island.

The second phase project at Qinshan Nuclear Power Plant, which is an indication that China's nuclear power industry has changed from simulation to the historical stage of commercial power generation, will involve construction of a total of two 600MW nuclear power generators at an investment of several billion yuan per unit. The No. 1 generator will generate power in the year 2000 and the No. 2 generator will generate power in 2001. This major battle has attracted hundreds of enterprises from the three big Shanghai, Harbin, and Sichuan power station manufacturing base areas and from throughout China to go all out in the arena and fight a coordinated battle, with north and south China joining hands to build China's first 600MW nuclear power generators.

Based on the principles established by the State Council, the second phase project at Qinshan Nuclear Power Plant will adhere to the principle of "China serving as the main factor, with Sino-foreign cooperation" in carrying out the construction. The capital is being raised from investments by the state, the Huaneng Group, Jiangsu, Zhejiang, and Anhui Provinces, and Shanghai Municipality.

An official in the Shanghai Municipality Nuclear Power Office said that in the past China had neither manufactured nor imported 600MW nuclear power generators, so as the curtain opens on this battle it will certainly involve a hard fight. It was determined after long and fierce bidding competition that the Shanghai Power Station Auxiliary Equipment Plant will be responsible for manufacturing the condensers, high-pressure heaters, low-pressure heaters, deoxygenators, water tanks, and other important equipment weighing a total of more than 2,000 tons for the two 600MW nuclear power generators. The Shanghai Boiler Mill will be responsible for manufacturing the steam generators and pressure stabilizers. The Shanghai Steam Turbine Plant will be responsible for manufacturing the steam-water separation reheaters, Shanghai Xianfeng Generator Plant will be responsible for manufacturing the nuclear power drive mechanisms, and Shanghai No. 1 Machine Tool Plant will be responsible for manufacturing the internal components for the reactor in the heart of the nuclear island. Nuclear experts said that at present only the United States, Germany, and a few other industrially developed countries have the capability of manufacturing this industrial equipment, which represents the highest levels of the modern world. Evidently, the Shanghai base area will be responsible for manufacturing about three-fifths of the total equipment for the second phase project at Qinshan.

Daya Bay Update

936B0096B Beijing RENMIN RIBAO OVERSEAS
EDITION in Chinese 21 Jun 93 p 1

[Article by reporters Huang Zhenzhong [7806 2182 0022] and Wang Chu [3769 2806]]

[Text] Shenzhen, 20 Jun—Daya Bay nuclear power plant is in its final stage; the No 1 unit reactor is expected to start up in July and be under formal operations for commercial use by year's end, and the No 2 unit will begin operating in the first half of next year.

On 1 June, upon receipt of the first feed-approval document from the State Nuclear Safety Bureau, the No 1 unit, under very strict quality guarantees, was smoothly checked through its 157 elements and various accessories, and the reactor core was safely and precisely fitted into place.

When the two units are fully operating they will generate 10 billion kWh annually with 70 percent going to Hong Kong, and 30 percent going to the Guangdong grid.

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